



Docket No. 26608-1

PATENT

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Todd W. Minor.

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**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

Applicants: Willard K. McClintock :  
Scott B. Kimmel :  
Serial No.: 09/909,487 : Group Art Unit: 1742  
Filed: July 20, 2001 : Examiner: Melvyn J. Andrews  
For: Steel Making Material Recycling System

**Request for Reconsideration**

Mail Stop RCE  
Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

The Official Action dated May 16, 2003, has been carefully considered. Accordingly, the changes presented herewith, taken in conjunction with the following remarks, are believed sufficient to place the application in condition for allowance.

### **Improper Withdrawal**

In the Official Action, the Examiner suggest that claims 8 to 20, 22 to 27, 30, 32 and 32 are withdrawn from consideration as being directed to a non-elected invention because the originally presented invention was constructively elected. However, 37 CFR 1.145 (Subsequent presentation of claims for different invention) states:

If, after an office action on an application, the applicant presents claims directed to an invention distinct from and independent of the invention previously claimed, the applicant will be required to restrict the claims to the invention previously claimed if the amendment is entered, subject to reconsideration and review as provided in §§ 1.143 and 1.144.

The claims originally presented and acted upon by the Office on their merits determine the invention elected by an applicant in the application (See MPEP 818.02(a), By Originally Presented Claims). Further, MPEP 803 (Restriction - When Proper) guideline requires examiners to provide reasons and/or examples to support conclusions for restriction.

Examiner has suggested reasons why present (amended) claims might be restricted, but has not suggested reasons why the Applicants' present claims are directed to an invention distinct from and independent of the corresponding invention in the previous claims. For example, Examiner has withdrawn from consideration present Claim 22 (as amended) but has not given any reason why present Claim 22 is directed to an invention distinct from and independent of the invention previously claimed in original Claim 22. That is, no reason is given why the originally claimed method of manufacturing steel is

directed to an invention distinct from and independent of the invention previously claimed method of manufacturing steel.

Similarly, no reasons are given why the applicants present Claims 8, 26 and 30 are directed to an invention distinct from and independent of the invention previously claimed in original Claims 8, 26 and 21, respectively, or claims dependent thereon or claims dependent on Claim 22. Examiner has not provided reasons and/or examples to support conclusions for the constructive election and withdrawal. Therefore, Applicants respectfully traverse the constructive election requirement and the withdrawal of Claims 8 to 20, 22 to 27, and 31 to 32 because it is improper and it would not require additional search from the original claims.

Further, in the Official Action, the Examiner suggest that three distinct inventions are claimed in the present application. The examiner states that Claims 1 to 7 are drawn to a steel processing material, Claims 8 to 20 and 22 to 25 are drawn to a method, and Claims 26, 27, and 30 to 32 are drawn to a steel processing material for addition into a heat of steel in an electric arc furnace. Examiner further states as an example that the product of Claims 1 to 7 can be used as an addition into a heat of steel in a steel making furnace which is not the electric arc furnace of Claims 8 to 20 and 22 to 25.

In MPEP 806.05(h) (Product and Process of Using) a product and a process of using the product can be shown to be distinct inventions if either or both of the following can be shown: (A) the process of using as claimed can be practiced with another materially different product; or (B) the product as claimed can be used in a materially different

process. According to MPEP 806.05(h), the burden is on the examiner to provide an example of (A) or (B) above. While examiner may be correct that the steel processing material of Claims 1 to 7 can be used as an addition into a heat of steel in a steel making furnace which is not the electric arc furnace of Claims 8 to 20 and 22 to 25, the electric arc furnace of Claims 8 to 20 and 22 to 25 is a species of the generic steel making furnace. On page 5, lines 19 to 21, of the Specification, steel making furnaces includes a basic oxygen furnace, an electric arc furnace, a degasser, or any similar furnace creating solid material from the exhaust chamber. Therefore, the electric arc furnace is not a materially different process than the steel making furnace and an example of a materially different process has not been given. As such, restriction is not required and is requested withdrawn.

Further, the Examiner suggests that Claims 8 to 20 and 22 to 25 and Claims 26, 27, and 30 to 32 are related as product and process of use. Examiner further states as an example that the product as claimed can be used in a materially different process, for example, an electric arc steel making process wherein any exhaust dust is not recycled. However, Claim 26 requires a steel processing material, at least partially recycled from an electric arc furnace, comprising an iron-bearing material having less than 2% moisture by weight and recycled from the arc furnace. Thus, the steel processing material must comprise iron-bearing material recycled from the arc furnace. Additionally, Claim 30 requires a steel processing material for addition into a heat of steel in an electric arc furnace comprising a dried post combustion material (PCM) recycled from the exhaust of an electric arc furnace. Thus, the steel processing material must comprise PCM recycled from exhaust of an electric arc furnace. Claim 8 requires a method of recycling exhaust waste

material from an electric arc furnace comprising recovering the exhaust waste material from an electric arc furnace and adding the exhaust waste material to the electric arc furnace wherein iron from the exhaust waste material is recycled.

Since the product has either PCM (a furnace exhaust material) from an electric arc furnace or material recycled from an arc furnace, and the process recycles waste material from an arc furnace, Examiner's conclusion that an electric arc steel making process wherein any exhaust dust is not recycled is not a meaningful example in light of the claimed invention. MPEP 806.05(h) provides that if the applicant either proves or provides a convincing argument that the alternative use suggested by the examiner cannot be accomplished, the burden is on the examiner to support a viable alternative use or withdraw the requirement. As such, the restriction is not required and is requested withdrawn.

Further, the Examiner suggests that Claims 1 to 7 and Claims 26, 27, and 30 to 32 are unrelated. Examiner further states as an example that the product of Claims 1 to 7 may be used as an addition into a heat of steel in a steel making furnace which is not an electric arc furnace and the product of Claims 26, 27, and 30 to 32 may be used in an electric arc steel making process wherein any exhaust dust is not recycled.

Since Claims 26, 27, and 30 to 32 claim either PCM (a furnace exhaust material) from an electric arc furnace or material recycled from an arc furnace, and Claims 1 to 7 claim a steel processing material for addition into a heat of steel in a steel making furnace comprising a dried post combustion material (PCM) recycled from the exhaust of the steel making furnace. While examiner may be correct that the steel processing material of

Claims 1 to 7 can be used as an addition into a heat of steel in a steel making furnace which is not the electric arc furnace of Claims 26, 27, and 30 to 32, the electric arc furnace of Claims 26, 27, and 30 to 32 is a species of the generic steel making furnace. On page 5, lines 19 to 21, of the Specification, steel making furnaces include a basic oxygen furnace, an electric arc furnace, a degasser, or any similar furnace creating solid material from the exhaust chamber. Therefore, the electric arc furnace is not a materially different process than the steel making furnace and an example of a materially different process has not been given. As such, restriction is not required and is requested withdrawn.

For the purpose of complying with 37 C.F.R. 1.143, Applicants hereby provisionally elect the invention of Claims 1-7 with traverse. Traversal is made on the basis that it would not be unduly burdensome for the Examiner to examine all claims in the present application, particularly since the Examiner has indicated that all claims are classified in Class 75. Further, traversal is made because the withdrawal of Claims 8 to 20, 22 to 27, 30, 31 and 32 is improper as discussed in the above paragraphs. Accordingly, reconsideration of the restriction requirement and examination of all of claims 1 to 20, 22 to 27 and 30 to 32 is requested.

#### **Traverse of Rejected Claims**

Claims 1 to 7 were rejected under 35 U.S.C. 103 (a) as being unpatentable over Calderon et al. (US 6,214,085) in view of Lehner et al. (US 5,853,453). This rejection is respectfully traversed.

In making the above rejection of Claims 1 to 7, Examiner specifically asserts that Claims 1 is unpatentable because Calderon discloses a method for direct steelmaking including the step of pneumatically injecting a fluxed iron/carbon product with immediate foaming of the slag, the iron/carbon product having been made by mixing iron ore concentrate, coal and dolomitic limestone, a material feeding system feeding material into hopper, these materials comprising iron ore such as iron ore concentrate and other iron bearing materials such as effluent dust and scale, and where these materials may also be dried prior to delivery to the hopper.

A case of obviousness can only be established by combining the teachings of the prior art where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 f.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

In the present Claim 1, post combustion material (PCM) is used. Calderon disclose iron-bearing materials such as iron oxide, effluent dust and scale, however, none of these are PCM. Effluent dust is not in anyway defined in Calderon, however, even if the effluent dust in Calderon is intended to be baghouse dust, which it arguably is not, it is definitely not PCM. In the Background of the Invention, page 1, lines 12-13, PCM is described as

particles that are too heavy or too large to be exhausted to the bag house and thus is clearly not baghouse dust nor an effluent dust.

In the Examiner's Response to Comments, Examiner stated that Applicants' argument that the claimed PCM described in the specification on page 1, lines 12 to 13 was not well taken because the specification also described on page 5, lines 16 to 19, that "the term "post combustion material" as used in this invention should be understood to cover any iron-bearing material from the exhaust of a steel making furnace." However, Examiner has misquoted this passage. The term "post combustion material" was changed to "furnace exhaust material" in Applicants' answer to Examiner's first office action. Reading the corrected term in conjunction with the rest of the paragraph in which it is contained, as well as the specification on page 1, lines 12 to 13 and the specification as a whole, makes clear the amendment was merely a correction of a typographical error. Applicants believe the current action has been highly biased by this misunderstanding and has kept the Applicants from having a proper action on the merits. Applicants ask that Examiner to withdraw the final rejection and reconsider an action on the merits based on the correct definition of the material claimed.

On page 1, lines 13-15, PCM is defined as exhaust material from the furnace that is gravity fed from the combustion chamber to the drop out box. The Environmental Protection Agency (EPA) also holds a distinction between baghouse dust and drop-out box slag, i.e. drop out box material. The EPA regulates bag house dust under hazardous waste code KO61 but, while the EPA acknowledges drop out box material, the EPA specifically



does not regulate drop out box material as hazardous. The EPA's acknowledgement of drop out box material serves to place PCM and/or drop out box material as a term of art known to those skilled in the art of steel making.

In the Examiner's Response to Comments, Examiner noted that no evidence had been provided that the EPA acknowledges drop out box material as a term of art. The Applicants respectively submit the New Steel article<sup>1</sup> "EPS: Drop-out box slag not a hazard," published July, 2001. The article states that, in a letter by Elizabeth Cotsworth, Director of the EPA's Solid Waste Office, "the U.S. EPA determined that drop-out box slag (DOBS) produced by EAFs is not covered by the hazardous waste listing for EAF dust." This was similarly reported in the U.S. Geological Survey Minerals Yearbook<sup>2</sup> for 2001, page 40.1, col. 2 last 5 lines, to the top of page 40.2, col. 1 first 4 lines.

Also, in the Examiner's Response to Comments, Examiner did not agree that that the term "drop out box materials" is limited to specific size, concentration or moisture content and did not categorically differ from Calderon "effluent dust." However, the New Steel article "EPS: Drop-out box slag not a hazard," states in paragraph 3:

Hoods and ductwork capture a significant amount of gaseous fumes and particulates. But they are not designed to remove large chunks of material that may be sucked into the duct connected to the EAF roof. This sometimes caused shutdowns. So melt shops installed drop-out boxes, which are large chambers into which the solidified material falls out of the exhaust stream, separating it from the gasses

and the particulate matter that continue through the ductwork to air-pollution control devices.

The “large chunks” distinguishes drop out box material from “effluent dust.”

Further, in the Specification, page 2, lines 16 to 22, a differences in moisture content in PCM is described as being due to water cooled duct work having leaks, sprays or other sources that may travel by gravity through the post combustion chamber and wet the post combustion material. PCM removed from the drop out box is typically stored in an outside yard for further disposition. Either in the drop out box or in the yard, the PCM can absorb a great deal of moisture from the atmosphere, rain or other sources. Contrarily, Baghouse dust travels dry to the baghouse, and, as a hazardous material, should not be allowed to get wet.

Therefore, PCM is different from “effluent dust” because of, among other things, its chunk type size characteristics versus dust, its variation in moisture content versus dust (Applicants know wet dust only as sludge and PCM is not anywhere compared to or defined as a sludge), its specific definition of being drop out box material, and its recognition as being non-hazardous by the EPA versus hazardous dust, such as baghouse dust.

These deficiencies of Calderon are not resolved by Lehner because Lehner also fails to suggest a material such as PCM in Claim 1. Therefore, Claim 1 is believed to be allowable in its present form and withdrawal of the rejection is

respectfully requested. Further, claims 2 to 7, dependent on an allowable claim, are also allowable and withdrawal of these rejections is also respectfully requested.

Further, Examiner admitted that, with respect to claim 3 and 7, Calderon does not disclose concentrations of the iron bearing materials, but examiner stated that Calderon recognized concentration to be a result-effective variable. The Examiner suggests that it would have been obvious to determine the optimum concentration as a source of iron suitable for recycling. However, Calderon did not suggest a steel processing material comprising about 5% to about 30% of the dried PCM as in Claim 3 nor the dried PCM comprising about 30% to about 55% Fe as in Claim 7.

Calderon relies on the iron bearing materials (col. 6, line 63 to col. 7 line 3) solely for the production of molten iron. Were Calderon to use concentration similar to those in Claims 3 and 7, the Calderon furnace would be a slag making furnace with a steel byproduct and thus be of little or no economic value. Calderon states that the invention renders the art of steelmaking significantly more economical than conventionally practiced (see Calderon Abstract, last sentence) and, though Calderon gives no concentrations, one skilled in the art would find by Calderon the concentrations of Claims 3 and 7 produce too much slag for economical steel production. Calderon must therefore teach away from iron bearing materials with any but very high concentrations of iron.

Claim 4 was also rejected under 35 U.S.C. § 103(a) as unpatentable over Calderon in view of Lehner. In the Official Action, the Examiner admitted Calderon's failure to disclose the water content in the mix, but asserted it would have been obvious to one having ordinary skill in the art to combine the teaching of Lehner to form a material with a low amount of water in order to provide sufficiently high strength particles for use in the converter. Examiner further asserted that Lehner discloses the water content of dehydrated granules formed from sludge that may advantageously contain a residual moisture of a maximum of 5 wt. % free water, which the examiner suggest to combine with Calderon to dry the materials in Calderon. The Examiner also asserts that the combining of these references makes obvious drying PCM to less than about 2% water in producing the steel processing material of claim 4.

The deficiencies of Calderon are not resolved by Lehner. As noted by Examiner, the motivation to combine the teaching of Lehner is to form a material with a low amount of water in order to provide sufficiently high strength particles for use in a converter. However, the Examiner has not suggested the desirability of providing high strength in the Calderon product. The motivation for drying in the present invention includes castability and porosity of the steel, melting time, steel cleanliness, furnace life, costs and safety (p.6, lines 1-8). Further, sizing of the PCM in the current invention is accomplished by other means, such as by screening, and is unrelated to the water content. Thus one skilled in the art would not be motivated to combine the teaching of Lehner to resolve the deficiencies of Calderon to include drying PCM to less than about 2% water in producing the steel processing material of Claim 4.

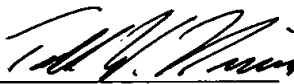
Further, Examiner noted in the Response to Arguments that the motivation to combine Lehner with Caldreon was to optimize the moisture content of the Calderon mixture to pneumatically fed into the furnace. However, as discussed, Lehner's motivation is to provide sufficiently high strength particles and not optimize moisture content as suggested by the examiner. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 f.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

More specifically, Lehner discloses a sludge that is first dehydrated at 30 to 50% hydration and mixed with quicklime to completely react the quicklime with the water in the sludge. The 30 to 50% hydration is clearly outside the less than about 2% water of Claim 4. Next, Lehner discloses drying the sludge and quicklime mixture to a maximum of 5 wt. % residual moisture free water. The purpose of this drying step is so that the mixture "will not swell or drive (sic?) up even after storage for some time" (col. 5, lines 47-48). Arguably, the 5% maximum hydration of Lehner may include the 2% maximum water content in Claim 4, however, the 5% maximum drying step in Lehner is only conducted after mixing sludge and quicklime. In contrast, in present Claim 4, a steel processing material for addition into a heat of steel in a steel making furnace comprises a dried post combustion material (PCM) recycled from the exhaust of the steel making furnace, and a slag foaming material. Thus, the drying of the PCM occurs before the PCM is mixed with the slag foaming material.

### Conclusion

Therefore, Applicants submit that the steel processing material defined by Claims 1 to 7 is nonobvious over and patentably distinguishable from Calderon in view of Lehner. Accordingly, these rejections are traversed and reconsideration is respectfully requested. Further, traversal is made because the withdrawal of Claims 8 to 20, 22 to 27, 30, 31 and 32 is improper as discussed in the above paragraphs. Accordingly, reconsideration of the restriction requirement and examination of all of claims 1 to 20, 22 to 27 and 30 to 32 is requested.

Respectfully submitted,

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